Human Immune System Mouse models as preclinical platforms for stem cell derived grafts

Grant Award Details

Human Immune System Mouse models as preclinical platforms for stem cell derived grafts

Grant Type:	Transplantation Immunology
Grant Number:	RM1-01732
Project Objective:	Overall objective of this project is develop efficient immunodeficient mice with human immune system (HIS) to provide platform for assessing stem cell based therapies

Investigator:

Name:	Ellen Robey
Institution:	University of California, Berkeley
Type:	PI

Disease Focus:	Immune Disease
Human Stem Cell Use:	Embryonic Stem Cell
Award Value:	$1,005,605
Status:	Closed

Progress Reports

Reporting Period:	Year 1
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Reporting Period:	Year 2
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Reporting Period:	Year 3
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Grant Application Details

Application Title:	Human Immune System Mouse models as preclinical platforms for stem cell derived grafts
Public Abstract:	A major obstacle to stem cell based therapies is the immune response of the patient to stem cell derived tissue, which can be recognized as foreign and attacked by the patient's immune system. T cells orchestrate immune responses and are "educated" about self versus foreign in an organ called the thymus. It may be possible to educate T cells in a patient to avoid attacking stem cell derived grafts by "re-educating" them in a thymus that contains the same material as the graft. Humanized mouse models have considerable potential as test beds for exploring different therapeutic approaches, including thymic re-education approaches because they allow for human cells to be observed and manipulated experimentally. This proposal aims to refine humanized mouse models to allow for different therapeutic strategies to promote the acceptance of stem cell grafts by a patient's immune system to be modeled and tested. This proposal takes advantage of the most recent innovations in microscopic imaging to probe the interactions between developing T cells and their support cells in living 3D tissues. In addition to probing thymic development, in the future these approaches could be further adapted to reveal the cellular events that occur when stem cell derived grafts are accepted or rejected, and to allow for preclinical testing of drugs. The successful completion of this project will bring us closer to realizing the benefits of stem cell research by providing a viable humanized immune system mouse model for preclinical testing of stem cell-based therapies.
Statement of Benefit to California:	The successful completion of this project will bring us closer to realizing the benefits of stem cell research by providing a viable humanized immune system mouse model for preclinical testing of stem cell-based therapies. This should benefit Californians in three ways: First many Californians are suffering from diseases for which there are currently no adequate treatments and for which stem cell research holds considerable promise. The availability of a preclinical platform for testing stem cell-based therapies based on humanized mice should accelerate the development of these therapies and get them more quickly to patients in need. Second, answers to basic questions related to human immune system will be of interest to educators and researchers in California, and will contribute to California's standing as center for research and education. Finally, there is potential economic benefit, since the biotech and pharmaceutical industry could make use of these methods to advance the development of stem cell based products.

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